

AS ISO 10987.3:2021
ISO 10987-3:2017



STANDARDS
Australia



Earth-moving machinery — Sustainability

Part 3: Used machines



AS ISO 10987.3:2021

This Australian Standard ® was prepared by ME-063, Earthmoving Equipment. It was approved on behalf of the Council of Standards Australia on 22 March 2021.

This Standard was published on 1 April 2021.

The following are represented on Committee ME-063:

- Australian Industry Group
- Better Regulation Division — SafeWork NSW
- Construction and Mining Equipment Industry Group
- Department of Natural Resources, Mines and Energy, Qld
- Department of Regional NSW
- Engineers Australia
- Institute of Instrumentation, Control & Automation Australia
- Minerals Council of Australia
- Mining Electrical and Mining Mechanical Engineering Society
- University of Queensland

This Standard was issued in draft form for comment as DR AS ISO 10987.3:2020.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

www.standards.org.au

ISBN 978 1 76113 264 3

Earth-moving machinery — Sustainability

Part 3: Used machines

First published as AS ISO 10987.3:2021.

COPYRIGHT

© ISO 2021 — All rights reserved
© Standards Australia Limited 2021

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth).

Preface

This Standard was prepared by the Standards Australia Committee ME-063, Earthmoving Equipment.

The objective of this document is to give requirements and relevant information for evaluating used earth-moving machines.

This document sets out how to evaluate a used machine, relative to the information provided by the manufacturer in the operator's manual, in order to verify that the machine is functional as intended by the manufacturer.

This document is applicable to earth-moving machines, as defined in ISO 6165, that are used and intended for resale.

NOTE The used machine might not meet all current standards and regulations (e.g. roading and hazardous environments).

This document is identical with, and has been reproduced from, ISO 10987-3:2017, *Earth-moving machinery — Sustainability — Part 3: Used machines*.

As this document has been reproduced from an International Standard, a full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

Contents

Preface	ii
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Used machine evaluation requirements	2
4.1 General	2
4.2 General requirements	2
4.3 Environmental protection requirements	3
4.4 Safety requirements	3
5 Verification of machine requirements	4
6 Warranty	4
7 Identification and information	4
7.1 Identification plate	4
7.2 Documentation	5
Annex A (informative) Example of inspection form	6
Bibliography	9

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*.

A list of all parts in the ISO 10987 series, published under the general title, *Earth-moving machinery — Sustainability*, can be found on the ISO website.

Introduction

Sustainability has become a concern in relation to earth-moving machinery, as for so many other products. Customers buying the machines are requesting information that can be used to promote sustainability for their work projects. With the increased interest in sustainability, many organizations are preparing sustainability guidelines and manufacturers are providing general sustainability information.

Sustainability covers a wide range of areas related to social, environmental and economic considerations for the development, manufacturing, useful life and end-of-life phases for earth-moving machines.

In addition to large and increasing numbers of new earth-moving machines, many thousands (perhaps hundreds of thousands) of used earth-moving machines are resold worldwide each year. The safety, emissions, noise, energy consumption, working performance and other characteristics of used machines can have problems which could cause potential risks to personal safety and the environment and which cannot be identified by buyers of used machines.

The development of an International Standards can help establish international, scientific, rational, feasible and economic specifications for used earth-moving machines and ensure that used machines meet established technical specifications when resold.

The main purpose and significance of developing this document are the following:

- a) to offer a technical guide for evaluating used earth-moving machines to
 - boost the normative, healthy and orderly development of the used-machine market for earth-moving machines,
 - improve and protect the rights of both sellers and buyers,
 - reduce the customers' purchase and operation costs, and
 - bring the customers more added value;
- b) improve the quality of used machines by
 - increasing the value of those machines,
 - enhancing the sustainable use of earth-moving machines in their lifetime,
 - promoting the application of remanufactured products, and
 - promoting the reasonable utilization of social resources.

NOTES

Australian Standard®

Earth-moving machinery — Sustainability

Part 3: Used machines

1 Scope

This document gives requirements and relevant information for evaluating used earth-moving machines.

It provides the means to evaluate a used machine, relative to the information provided by the manufacturer in the operator's manual, in order to verify that the used machine is functional as intended by the manufacturer.

This document is applicable to earth-moving machines as defined in ISO 6165 that are used and are planned to be resold.

NOTE The used machine might not meet all current standards and regulations (e.g. roading and hazardous environments).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6165, *Earth-moving machinery — Basic types — Identification and terms and definitions*

ISO 10987, *Earth-moving machinery — Sustainability — Terminology, sustainability factors and reporting*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6165, ISO 10987 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

used machine

earth-moving machine that enters the market for resale after it has been used

3.2

warranty

commitment of the guaranteed period for the quality and service of *used machines* (3.1)

Note 1 to entry: The period of warranty begins on the delivery date after the signing of the contract.

3.3

abnormal noise

unusual sound which can indicate that part of the machine is no longer functioning properly

4 Used machine evaluation requirements

4.1 General

The requirements in this clause are provided to allow the owner, seller or their representative to evaluate used machines relative to the information provided by the manufacturer in the machine operator's manual to verify that the used machine is functioning as intended by the manufacturer.

An inspection form for used machines in four sections (see example in [Annex A](#)) may be used to provide information on the machine under inspection.

- a) The upper section of the first page provides specific identification of the used machine.
- b) The middle section of the first page provides a checklist to document the results of a used machine inspection. A check in the box by each inspection item indicates that the used machine is functioning properly as intended by the manufacturer as stated in the operator's manual.
- c) The lower section of the first page has information about the inspection person.
- d) The section on the second page provides a detailed inspection list based on this document's requirements.

4.2 General requirements

The owner, seller or their representative shall evaluate the used machine and verify the following.

- a) The labels and symbols for the machine are in accordance with the operator's manual and are readable. The labels include the lubrication diagram, if the manufacturer supplied one on the machine when new.
- b) Control devices function as specified in the control information in the machine operator's manual.
- c) The machine is able to start correctly.
- d) Equipment and attachments are in acceptable condition and function as specified in the operator's manual.
- e) All hydraulic cylinders and rotary mechanisms operate correctly when the engine is running at idle.
- f) The moving parts function as intended without abnormal noise.
- g) The powertrain system functions and changes speeds smoothly without abnormal smoke or abnormal noise.
- h) The engine functions without leakage from the lubrication, cooling, intake, exhaust and fuel delivery systems. Slight leakage is acceptable.
- i) Tanks do not have leakage or substantial permanent deformation.
- j) Drivetrain system delivers power and shifts gears smoothly without abnormal noise.
- k) Hydraulic systems (such as hydraulic pumps, multiple-function valves, hydraulic motors, etc.) run without leakage or abnormal noise. Hydraulic hoses and tubes are fastened correctly without damage. Hydraulic cylinders do not have leakage, damage or bending.
- l) Steering system works correctly without jerking or excessive deadband.
- m) Fluid level indicators for fuel and hydraulic tanks, if provided, function correctly. Pressure devices in the tanks, such as vent or safety valve, function properly.
- n) All instrument panel functions (for example, hour meters, lights and signal devices) function as intended.

- o) Lighting, signalling and marking lights, and reflex-reflector devices are fitted and functional.

4.3 Environmental protection requirements

The owner, seller or their representative shall evaluate the used machine and verify the following.

- a) The primary features of the machine impacting sound compliance (for example, exhaust system, sound reduction padding, windows and engine covers) have been installed and are in an acceptable working condition.
- b) The exhaust emission certification label, if originally fitted on the engine for the used machine, is legible.
- c) If equipped with air-conditioning, the refrigerant label is legible.

4.4 Safety requirements

The owner, seller or their representative shall evaluate the used machine safety-related items and verify that the following requirements have been met.

- a) Safety signs on the used machine are in place as specified in the operator's manual and are legible.
- b) For used machines equipped with an operator's cab, the doors and windows function smoothly. The lock of the door works and is reliable. The cab does not leak. Glazing material on the windows is made of safety glass or other material that provides similar safety performance with the appropriate labelling on the glass (for example, see ECE R43 and ANSI Z26.1).
- c) The main structural parts (for example, equipment, undercarriage and rotary platform) are in acceptable condition. Identify any cracks or obvious deformation in the used machine inspection report.
- d) Walkways, stairs, handrails and handholds are in place and in acceptable condition. When the window panel is used as an emergency exit, it has an appropriate marking (for example, see IEC 61310-1:1995, Figure 8).
- e) Used machines with rubber tyres have tyre and rim load performance adapted to the machine's purpose and application. The rims are in acceptable condition. Rims have clear identification (for example, see ISO 4250-3).
- f) When used machines are equipped with TOPS, ROPS or FOPS, the label is located on the structure and the structure is in acceptable condition. No signs of permanent deformation, cracks or corrosion that reduce the material cross section of structural members shall be present.
- g) Used machines fitted with ROPS or TOPS have an operator restraint system that meets the operator's manual specifications. Seat belt fabric shall be in acceptable conditions and shall not have cuts or signs of excessive wear.
- h) Used machines with provision for a seated operator are fitted with an adjustable seat that supports the operator in a position that allows the operator to control the machine under the intended operating conditions.
- i) Used machine brakes comply with the brake test defined in the operator's manual, if specified. Brakes and brake components are in acceptable condition.
- j) The steering system of wheeled machines functions properly (for example, without excessive steering force or delays or free play in the steering control).
- k) The hydraulic hoses show no abnormal signs of aging, crack, damage, loosening, etc. Pipes and hoses located inside the cab or within 1 m of the operator are guarded as provided by the manufacturer. Note any damage in the inspection report.

- l) Electric wires do not show abnormal aging or damage. Plugs and sockets are not loose.
- m) Audible warning devices function correctly (travel warning alarm, reverse warning alarm, horn).
- n) Guards are in place and in acceptable condition.
- o) All safety locks (for example, articulation lock, lift arms), where initially fitted, are in place and in acceptable condition.
- p) Fenders are in place and in acceptable condition.
- q) Batteries are firmly attached in a ventilated space.
- r) An electric socket, intended for the connection of a lighting device for service and maintenance use, functions correctly, if provided on the machine.
- s) Access panels (for example, engine cover, access doors) that are provided with a hold open device are in place and in acceptable condition.
- t) All safety improvement programs have been completed.

5 Verification of machine requirements

One or a combination of the following shall be used to verify that the requirements have been met for used machines:

- visual examination;
- measurement;
- functional evaluation.

6 Warranty

If a used-machine warranty is provided, it shall be in accordance with the trading contract.

NOTE 1 Regulatory requirements can specify the warranty period for used machines in a country or region.

NOTE 2 The warranty period for a complete used machine and for specific components on that same used machine can be different. For example, the machine (excluding the wearing parts) can have a three-month or 500 h warranty (whichever comes earlier) and the main components (for example, engine(s), pumps, motors, valves and hydraulic cylinders) can have a six-month or 1 000 h warranty (whichever comes earlier).

7 Identification and information

7.1 Identification plate

Used machines shall have an identification plate that has the machine PIN or serial number and may include the following information in a legible and indelible condition through its whole life:

- a) name and address of the manufacturer;
- b) machine model;
- c) year of manufacture; if the year of manufacture is not on the machine, it should be available from the seller.

The mass should be available in the machine operator's manual.

7.2 Documentation

Used machines shall have an operator's manual in acceptable condition.

A photo of the used machine should be provided.

Used machines should have the following documents or information:

- a) completed inspection form for used machines. See [4.1](#) and [Annex A](#);
- b) parts manual, if available;
- c) declaration for major accidents, which include roll-over, fire, submersion in water, severe damage as a result of falling object;
- d) maintenance record, if available;
- e) packing list for shipping the used machine.

Annex A (informative)

Example of inspection form

Inspection form for used earth-moving, construction and surface-mining machines

Used machine information

Manufacturer: _____ Machine type: _____
 PIN or serial number: _____ Model number: _____
 Engine model: _____ Year of manufacture: _____
 Engine serial number: _____

Based on inspection and in accordance with ISO 10987-3, the following checked items are acceptable for use consistent with the specifications in the operator's manual for this used machine:

OK	NOT OK	General requirements
<input type="checkbox"/>	<input type="checkbox"/>	Appearance – acceptable damage or cracks in structure
<input type="checkbox"/>	<input type="checkbox"/>	Operators manual and safety labels in place – available in appropriate language, date or PIN plate present
<input type="checkbox"/>	<input type="checkbox"/>	Safety items in place – seat belt, ROPS, FOPS, guards, warnings, noise label (if applicable)
<input type="checkbox"/>	<input type="checkbox"/>	Brakes – function properly to stop and hold machine
<input type="checkbox"/>	<input type="checkbox"/>	Steering – acceptable steering control
<input type="checkbox"/>	<input type="checkbox"/>	Function of controls – all controls function as intended with acceptable cycle times
<input type="checkbox"/>	<input type="checkbox"/>	Hydraulics – acceptable hoses and leaks, run without abnormal noise
<input type="checkbox"/>	<input type="checkbox"/>	Electrical – functioning acceptably, harness damage, lights
<input type="checkbox"/>	<input type="checkbox"/>	Drive train – transmission, drive shafts, and final drive function as intended.
<input type="checkbox"/>	<input type="checkbox"/>	Engine – acceptable power, response and cooling
<input type="checkbox"/>	<input type="checkbox"/>	Cab – seat, displays, safety glass, mirrors, heating, air conditioning, wipers, keys, visibility obstructions (if applicable)
<input type="checkbox"/>	<input type="checkbox"/>	Access systems – in place and not damaged
<input type="checkbox"/>	<input type="checkbox"/>	Equipment and attachments – acceptable condition and function as specified
<input type="checkbox"/>	<input type="checkbox"/>	Wear items – tires, cutting edges, undercarriage

Used machine inspection by:

Name: _____ Signature: _____
 Title: _____ Date: _____
 Organization: _____
 Address: _____

ISO 10987-3

Detailed inspection list based on ISO 10987-3 requirements

Used machine information

PIN or serial number: _____.

OK NOT OK

4.2 General requirements

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | A) Labels in accordance with operators manual including lubrication diagram. |
| <input type="checkbox"/> | <input type="checkbox"/> | C) Machine is able to start correctly. |
| <input type="checkbox"/> | <input type="checkbox"/> | E) All hydraulic cylinders and rotary mechanisms operate correctly when the engine is running at idle. |
| <input type="checkbox"/> | <input type="checkbox"/> | F) The moving parts function as intended without abnormal noise |
| <input type="checkbox"/> | <input type="checkbox"/> | G) The powertrain system runs and changes speeds smoothly without abnormal noise and smoke. |
| <input type="checkbox"/> | <input type="checkbox"/> | H) Auxiliaries of the engine (e.g. lubrication, cooling, intake/exhaust and fuel delivery systems) function without leakage. |
| <input type="checkbox"/> | <input type="checkbox"/> | I & M) Tanks do not have any damage or leakage, fuel and hydraulic tanks are provided with a fluid level indicator. Pressures in the tanks automatically compensate by appropriate devices (vent, etc.). |
| <input type="checkbox"/> | <input type="checkbox"/> | J) Drivetrain system deliver the power and shift gears smoothly without abnormal noise. |
| <input type="checkbox"/> | <input type="checkbox"/> | K) Hydraulic hoses are fastened well without damage. Hydraulic cylinders do not have leakage, damage or bending, etc. |
| <input type="checkbox"/> | <input type="checkbox"/> | N) All instrument panel functions, (e.g. hour meters, lights and signal devices) function as intended. |
| <input type="checkbox"/> | <input type="checkbox"/> | O) Lighting, signalling and marking lights, and reflex-reflector devices are functional. |

4.3 Environmental requirements

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | A) The primary factors of the machine impacting sound compliance, (for example, exhaust system, sound reduction, etc.) are installed and in good working order. |
| <input type="checkbox"/> | <input type="checkbox"/> | B) The exhaust emission certification label for the used machine is legible. |
| <input type="checkbox"/> | <input type="checkbox"/> | C) If equipped with air conditioning the refrigerant label is legible. |

4.4 Safety requirements

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | B) For used machines equipped with an operator's cab, the doors and windows function smoothly. The lock of the door works, the cab does not leak and the glass on the windows are made of safety glass or other material that provides similar safety performance with the appropriate labelling on the glass. |
| <input type="checkbox"/> | <input type="checkbox"/> | E) Wheeled machines with rubber tyres have tyre and rim load performance specified. The rims are in good condition. Rims have clear identification. |
| <input type="checkbox"/> | <input type="checkbox"/> | F & G) If equipped with TOPS, ROPS or FOPS structure, the label is located on the structure and the structure is in good condition and a restraint system that meets the operator's manual specification. |
| <input type="checkbox"/> | <input type="checkbox"/> | L) Electric wires do not show aging or damage. Plugs and sockets are not loose. |
| <input type="checkbox"/> | <input type="checkbox"/> | M) Audible warning devices (travel warning alarm, reverse warning alarm, horn) function. |
| <input type="checkbox"/> | <input type="checkbox"/> | N & P) Guards and Fenders are in place and in good condition. |
| <input type="checkbox"/> | <input type="checkbox"/> | O) All safety locks (e.g. articulation lock, lift arms) where initially fitted are in place and in good condition. |
| <input type="checkbox"/> | <input type="checkbox"/> | Q) Batteries are firmly attached in a ventilated space. |
| <input type="checkbox"/> | <input type="checkbox"/> | R) An electric socket intended for the connection of a lighting device for service and maintenance use, is provided on the machine and is easily accessible. |
| <input type="checkbox"/> | <input type="checkbox"/> | S) Access panels (e.g. engine cover, access doors) that are provided with a hold open device are in place and in good condition. |

Bibliography

- [1] ISO 4250-3, *Earth-mover tyres and rims — Part 3: Rims*
- [2] ISO 6016, *Earth-moving machinery — Methods of measuring the masses of whole machines, their equipment and components*
- [3] ISO 7000, *Graphical symbols for use on equipment — Registered symbols*
- [4] ISO 10261, *Earth-moving machinery — Product identification numbering system*
- [5] ISO 20474-1, *Earth-moving machinery — Safety — Part 1: General requirements*
- [6] IEC 61310-1:1995, *Safety of machines — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals*
- [7] ANSI Z26.1, *Safety glazing materials for glazing motor vehicles and motor vehicle equipment operating on land highways — Safety standard*
- [8] ECE R43, *Uniform provisions concerning the approval of safety glazing and glazing material. Uniformly-toughened glass panes*
- [9] JB/T10694-2007, *Acceptance specifications for imported used excavator*

NOTES

Standards Australia

Standards Australia develops Australian Standards® and other documents of public benefit and national interest. These Standards are developed through an open process of consultation and consensus, in which all interested parties are invited to participate. Through a Memorandum of Understanding with the Commonwealth Government, Standards Australia is recognized as Australia's peak non-government national standards body.

For further information visit www.standards.org.au

Australian Standards®

Committees of experts from industry, governments, consumers and other relevant sectors prepare Australian Standards. The requirements or recommendations contained in published Standards are a consensus of the views of representative interests and also take account of comments received from other sources. They reflect the latest scientific and industry experience. Australian Standards are kept under continuous review after publication and are updated regularly to take account of changing technology.

International Involvement

Standards Australia is responsible for ensuring the Australian viewpoint is considered in the formulation of International Standards and that the latest international experience is incorporated in national Standards. This role is vital in assisting local industry to compete in international markets. Standards Australia represents Australia at both the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).



GPO Box 476 Sydney NSW 2001
Phone (02) 9237 6000
mail@standards.org.au
www.standards.org.au